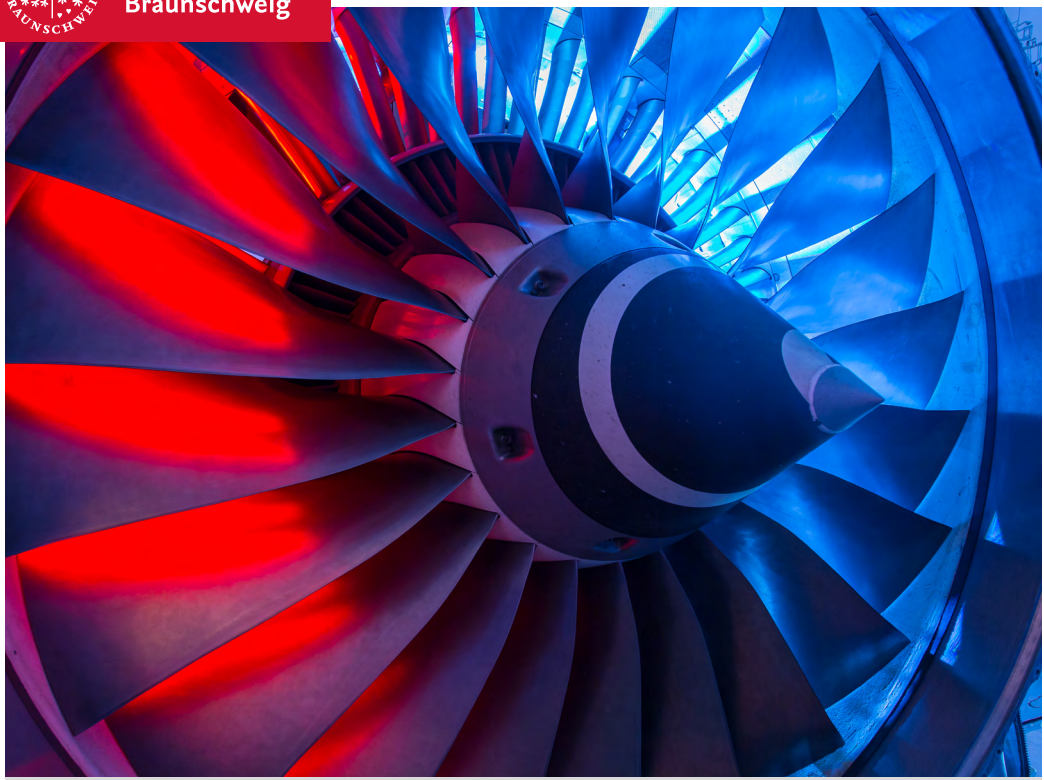
Technische Universität Braunschweig

TU BRAUNSCHWEIG
summer school



Summer School 2025

SE²A Sustainable and Energy-Efficient Avia
Cluster of Excellence

International Summer School: Advanced Sustainable Aviation Technologies

Photo: Sebastian Olschweski/TU Braunschweig

Key facts

Time period	01–12 September 2025
Registration deadline	15 August 2025
Event form	Online (01–05 September) and on site (08–12 September)
Participation fee	Free of charge
Language of instruction	English (on the level B2/C1)
Workload	90 hours, divided into virtual and on-site phases
Credits	3 ECTS credits
Certificate	Graded certificate
Target group	Master students of any discipline with a strong interest in sustainable aviation technologies

Any questions?

Please do not hesitate to contact us, we are happy to help!

Joana Zimmer
+49 531 391 14339
summerschool@tu-braunschweig.de

Course overview

Please note that this preliminary course overview may be subject to change on short notice.

	Online part Link for all Online Lectures: Webex					On-site part at TU Braunschweig: Niedersächsisches Forschungszentrum Fahrzeugtechnik (NFF),Hermann-Blenk-Str. 42, Room: VW 1/2				
	Mon, 01 Sep	Tue, 02 Sep	Wed, 03 Sep	Thu, 04 Sep	Fri, 05 Sep	Mon, 08 Sep	Tue, 09 Sep	Wed, 10 Sep	Thu, 11 Sep	Fri, 12 Sep
08:30–10:00 am	Introduction	Materials and Structures	Emissions and climate aspects	Combustion Emissions	Overall Aircraft Requirements	Welcome	Visit to Aerodata AG (until 10:30 am)	Visit to Hannover Airport Lecture (Roll) & Guided Tour (until 01:00 pm)	Operational Considerations for Aircraft Engine MRO (online)	Project Presentation
10:00–10:30 am	Coffee Break					Coffee Break			Coffee Break	
10:30–12:00 pm	Aircraft Aerodynamics	Advanced Systems Engineering	Power Electronics for Aviation	Combustion Fundamentals for Sustainable Aviation	Airline Operations Research	Group Work with Expert Consultants	Group Work with Expert Consultants (Start at 11:00 am)		Group Work with Expert Consultants	Project Presentation
12:00–01:00 pm	Lunch Break					Lunch Break			Lunch Break	
01:00–02:30 pm	Energy Supply (H2)	Lifecycle Assessment	Sustainable Air Traffic Management	Noise Prediction and Assessment	Energy Supply - Batteries	Group Work with Expert Consultants	Group Work with Expert Consultants		Group Work with Expert Consultants	Project Presentation
02:30–02:45 pm	Coffee Break					Coffee Break				
02:45–04:15 pm	Fuel cells for Aviation	Electric Propulsion Machines	Flight Control	Improving aircraft performance through flow control	Online Quiz	Braunschweig Guided City Tour (04:00–05:30 pm)	Group Work with Expert Consultants	Group Work with Expert Consultants	Aerospace Lab Tour (Campus Research Airport Braunschweig)	Presentations and Closing Ceremony (Certificates)
04:15–04:45 pm	Break			Break						
04:45–05:30 pm	Virtual Campfire			Q&A					Barbecue	

Modules and projects

Lecture modules
(online preparation phase and on-site morning sessions)

- Advanced Aircraft Performance / Design
- Advanced Propulsion Systems (BLI, UBHR, Open Rotor, Distributed Propulsion)
- Air Traffic Management & Operations Research
- Advanced Design Methods (MDO, Digital Twin)
- Future Aviation Fuels and Energy Carrier – Advantages, Disadvantages and Risks
- "The Airline Perspective" (Fleet Planning and Operation)
- Other Disciplines (e.g. Life-Cycle Assessment, Climate Modelling)

Project work
(defining problems with industry partners)

- Definition of Top-Level Requirements and Basic Mission Description for a Future "Low-Emission-Aircraft"
- First Preliminary Design of Aircraft
- First Preliminary Design of Propulsion System
- Assessment and Discussion of Pros and Cons
- Aspects of Integration into the Global Aviation Systems

Project ideas
(4–5 students per group estimated)

- Sustainable Aviation Solutions for Reg./Short Range
- Sustainable Aviation Solutions for Medium Range
- Sustainable Aviation Solutions for Long Range

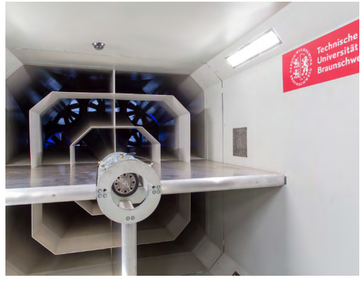
Photo: Kristina Kottig/TU Braunschweig

The world is facing an enormous challenge in transferring aviation into a more sustainable and greener transport mode.

In the long run, sustainable and emission-free flights over the entire aviation sector from short range to long range operation are the current priority and require enormous research and development activities which can by no means be limited to classical aerospace disciplines. Instead, they require new interdisciplinary approaches, methods and teams covering all aspects from aerospace, from materials to structures, from energy to propulsion as well as aircraft design, electrical engineering and even economic and social sciences.

Of course, this all starts with an up to date insight in the most current state of the art in aviation. In our Summer School course, you can acquire both theoretical knowledge and practical project experience in the field to address these grand challenges, and to connect with fellow students from different countries.

The programme is divided into two parts: The basic knowledge about methods and technologies will be given in lectures held by professors from TU Braunschweig and our partner universities as well as from aviation industry experts during the virtual phase. Afterwards, you will put your knowledge into practice. The on-site phase will consist of additional lectures in Braunschweig to gain specific insights and well as a hands-on project that will be conducted in international and interdisciplinary teams, supervised by professors. The Summer School will be complemented by a rich social programme: There will already be some joint online evening events to exchange ideas during the online phase. During the on-site phase, participants will spend the afternoons taking part in activities in Braunschweig. You will get to know the city, the university's research airport as well as one of TU Braunschweig's research facilities. You will also have enough time to explore the city on your own and to get to know your fellow students.



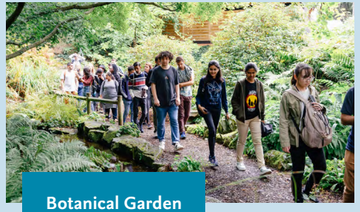
Photos: Sebastian Olschweski/TU Braunschweig; Walter Bergmoser/TU Braunschweig

Impressions of our Summer Schools

Visits to institutes

Braunschweig's historic centre

Campus of TU Braunschweig



Botanical Garden

Free-time activities

Research Airport

Photos: Lasse Ebbecke/TU Braunschweig; Simone Fürst/TU Braunschweig; Christopher Vehrke/TU Braunschweig

Application

Please apply until 15 August 2025. Registration may be closed before the deadline in case the maximum of participants is reached.

Please use the application form that you can find on our website:

→ www.tu-braunschweig.de/summer-school

After filling out the form, please send it to us via email:

✉ summerschool@tu-braunschweig.de

funded by

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Photo:
Stephan Nachtigall / TU Braunschweig